

CHAPTER 7

THE GOVERNMENT OF THE  
HONG KONG SPECIAL ADMINISTRATIVE REGION

GENERAL REVENUE ACCOUNT

CAPITAL INVESTMENT FUND

GOVERNMENT SECRETARIAT

Trade and Industry Bureau  
Education and Manpower Bureau

GOVERNMENT DEPARTMENT

Industry Department

The Government's funding schemes for  
promoting technology development in industry

Audit Commission  
Hong Kong  
3 October 1997

## CHAPTER 7

# THE GOVERNMENT'S FUNDING SCHEMES FOR PROMOTING TECHNOLOGY DEVELOPMENT IN INDUSTRY

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## CHAPTER 7

### THE GOVERNMENT'S FUNDING SCHEMES FOR PROMOTING TECHNOLOGY DEVELOPMENT IN INDUSTRY

#### Summary and key findings

1. **Introduction.** The economy of Hong Kong has undergone a structural transformation in the past two decades. The contribution of the manufacturing sector to the Gross Domestic Product declined from 22% during 1985-1987 to 9% in 1995. Nevertheless, the manufacturing sector still remains an important sector of the economy of Hong Kong. The Government provides support to the development of technology in industry through initiatives carried out by publicly-funded industry-support organisations and the funding schemes operated directly by the Government. These funding schemes are:

- the New Technology Training Scheme (NTTS);
- the Applied Research and Development Scheme (ARDS);
- the Industrial Support Fund (ISF);
- the Cooperative Applied Research and Development Scheme (CARDS); and
- the Services Support Fund (SSF).

2. **Audit review.** Up to 1996-97, the Government had allocated \$1,045 million to these funding schemes. Grants and loans disbursed from these schemes up to March 1997 amounted to \$682 million. An audit was conducted to examine the administration of these funding schemes (except the SSF which has been in operation for just one year) in order to assess the effectiveness of these schemes in assisting industrial development. The findings of the audit are summarised below.

3. **New Technology Training Scheme.** The NTTS was established in June 1992 to provide grants to assist training in new technologies. It has a capital sum of \$105 million. Audit observed the following inadequacies:

- contrary to the original intention, more resources had been allocated for local training courses than overseas training courses;
- the training courses were shorter than originally planned and the amounts of training grants were also smaller than intended. It is doubtful whether these courses could meet the original objective of the Scheme; and
- the Vocational Training Council had not conducted periodic follow-up reviews on major training grants to ensure that the trainees had effectively applied the acquired new technologies to the companies.

4. **Applied Research and Development Scheme.** The ARDS, established in February 1993, provides loans or equity participation to local companies undertaking applied research and development projects. It is operated with an allocation of \$200 million from the Capital Investment Fund. Audit found the following inadequacies in the operation of the Scheme:

- the number of projects assisted under the ARDS was much lower than expected;
- the success of some completed projects was questionable;
- surplus funds of some \$100 million were held by the Applied Research Council; and
- there was inadequate assurance that the required share of fundable costs had been contributed from non-government sources.

5. **Industrial Support Fund.** The ISF, established in April 1994, provides grants to finance projects which are beneficial to the technology development of industry. By the end of 1996-97, total grants of \$766 million had been approved to finance 207 projects. Audit found that:

- the provision of grants of \$11.7 million to an industrial design company was at variance with the ambit of the Scheme;
- the viability of the Telecommunications Product Technology Centre which involved an ISF grant of \$84 million was not adequately assessed. The capability of this Centre to become financially self-sufficient on schedule was questionable;
- adequate follow-up action had not been taken by the Industry Department to ensure that project results had been effectively applied to industry; and
- actions taken to deal with surplus ISF funds were questionable.

6. **Cooperative Applied Research and Development Scheme.** The CARDS was established in June 1995 with a \$50 million allocation from the ISF. As the Scheme is operated in a similar manner as the ARDS, some audit observations relating to the latter apply similarly to the CARDS.

7. **Services Support Fund.** The SSF was established in July 1996 with an allocation of \$50 million. It has been in operation for just one year and has been excluded from this audit.

8. **Audit recommendations.** Audit has made a number of recommendations to the Administration to address the inadequacies found in the operation of the various funding schemes. Based on the findings of this audit, Audit considers that there is a need to conduct an overall strategic review of the various funding schemes in order to ensure that these schemes meet the long-term needs of Hong

Kong. Audit has recommended that the Administration should conduct an overall strategic review of the funding schemes.

9. **Response from the Administration.** The Administration has agreed with most of the audit recommendations.

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**INTRODUCTION**

**The Government's industrial development policy since mid-1980s**

7.1 The economy of Hong Kong has undergone a structural transformation in the past two decades. In line with the continued expansion of the service sector and the on-going relocation of manufacturing processes to mainland China since the mid-1980s, the contribution of the manufacturing sector to the Gross Domestic Product (GDP) declined steadily. It dropped from 22% during the period from 1985 to 1987, to 18% in 1990, and then to 9% in 1995. Nevertheless, the manufacturing sector still remains an important sector of the economy of Hong Kong. **The Government's industrial development policy is to facilitate, within the framework of a free market, the further development of manufacturing and manufacturing-related industries in Hong Kong.** To achieve this policy, the Government provides "maximum support" to industry to enable it to become more competitive through productivity growth, quality improvement and product innovation. The Government also supports applied research and development, promotes inward direct investment and encourages technology transfer and upgrade.

7.2 The Industry Department (ID) is responsible for the implementation of the Government's industrial development policy. The services provided by the ID to the manufacturing industries include:

- the promotion of the application of quality assurance;
- the promotion of inward investments;
- **the formulation and implementation of initiatives which promote the application of technology;**
- the participation in the formulation and implementation of government policies relating to employment, environmental protection, provision of infrastructure as well as education and manpower; and
- the provision of development support services.

**The Government's initiatives to support the development of technology in industry**

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7.3 The Government recognises the importance of technology to the maintenance of the competitiveness of the manufacturing industries. It has accepted a responsibility for providing assistance to enable manufacturers to upgrade the technology level of their manufacturing processes. The initiatives of the Government to support the development of technology in industry could be broadly categorised into those undertaken by publicly-funded industry-support organisations (Note 1) and those undertaken directly by the Government, as described in paragraphs 7.4 and 7.5 below.

7.4 ***Initiatives undertaken by publicly-funded industry-support organisations.*** The major initiatives undertaken by publicly-funded industry-support organisations include:

- the provision of education and training in science and technology by the tertiary institutions and the Vocational Training Council (VTC);
  
- the provision through the Hong Kong Industrial Estates Corporation of accommodation at development cost to advanced technology industries. At present, there are three industrial estates located at Tai Po, Yuen Long and Tseung Kwan O. The Government is planning to develop a fourth industrial estate in Tuen Mun;
  
- the business incubation services and accommodation offered to technology-based companies by the Hong Kong Industrial Technology Centre Corporation through its Technology Centre at Kowloon Tong. A second Technology Centre is planned to be built by Year 2000; and
  
- industrial and management consultancies, technical support services and technology training programmes offered by the Hong Kong Productivity Council (HKPC).

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**Note 1:** *Publicly-funded industry-support organisations include the tertiary institutions, the Vocational Training Council, the Hong Kong Productivity Council, the Hong Kong Industrial Technology Centre Corporation and the Hong Kong Industrial Estates Corporation.*

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To further support the development of technology, in January 1997, the Government set up a Planning Committee, chaired by the Director-General of Industry, to plan for building a Science Park in Pak Shek Kok in the New Territories.

7.5 **Initiatives undertaken directly by the Government.** Since June 1992, the Government has progressively implemented several funding schemes to provide financial assistance to the manufacturing industries to promote technology development. Because service industries are playing an increasingly important role in the economy of Hong Kong, since July 1996, the Government has introduced a funding scheme to support further development in the service sector. Altogether, five industrial support funding schemes have been established. These funding schemes provide different types of financial assistance to industry, such as research grants, loans, equity participation and training subsidies. The five industrial support funding schemes are:

- **the New Technology Training Scheme (NTTS)** which provides grants to assist training in new technologies;
  
- **the Applied Research and Development Scheme (ARDS)** which provides loans or equity participation to finance applied research and development projects;
  
- **the Industrial Support Fund (ISF)** which provides grants to finance projects which are beneficial to the technology development of industry;
  
- **the Cooperative Applied Research and Development Scheme (CARDS)** which provides loans or equity participation to finance applied research and development projects involving mainland China and Hong Kong experts; and
  
- **the Services Support Fund (SSF)** (Note 2) which provides grants or loans to finance projects which facilitate the growth and further development of Hong Kong's service

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**Note 2:** *The SSF was established in July 1996 when the Finance Committee of the Legislative Council approved an allocation of \$50 million to set up the Scheme. The projects approved to be supported under the Scheme may involve technology transfer, training or information dissemination.*

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industries.

Apart from the NTTS, the funding schemes fall under the policy portfolio of the Trade and Industry Bureau (TIB) of the Government Secretariat and are operated by the ID. The NTTS is under the policy portfolio of the Education and Manpower Bureau (EMB) of the Government Secretariat and is operated by the VTC.

7.6 A summary of the objectives, the funding levels and administration of the five funding schemes is given in Annex A.

**Funds allocated to the funding schemes**

7.7 Since 1992, the Administration, with the approval of the Finance Committee (FC) of the Legislative Council, has allocated about \$1,045 million to the five funding schemes to support the development of technology in industry. Grants and loans disbursed by the schemes up to March 1997 amounted to \$682 million. A breakdown is as follows:

	<b>Funds allocated up to 1996-97 (\$ million)</b>	<b>Grants/loans disbursed up to March 1997 (\$ million)</b>
NTTS	105	5
ARDS	200	34
ISF	640 (see Note)	635
CARDS	50	8
SSF	<u>50</u>	<u>nil</u>
<b>Total</b>	<b><u>1,045</u></b>	<b><u>682</u></b>

*Note: This figure does not include \$50 million transferred to the CARDS.*

**AUDIT OBJECTIVE AND SCOPE**

7.8 The objective of establishing the various funding schemes (which are the Government's direct support for technology development in industry) is to provide assistance in industrial

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development. As most of these schemes (except the SSF) have been in operation for several years, it is an opportune time to conduct an audit on them. The main objective of the audit is to examine the administration of these funding schemes in order to assess their effectiveness in assisting industrial development. The audit indicated that there was room for improvement in the management of these schemes.

7.9 The Government's indirect support for industry through the publicly-funded industry-support organisations (see Note 1 above) was not included in this audit. The SSF was also excluded from this audit as it had been established for only about a year.

### **THE NEED FOR GOVERNMENT SUPPORT**

7.10 Hong Kong is no longer a low-wage economy. Many lower value-added processes such as fabrication, assembly and packaging have been relocated elsewhere, notably to mainland China. Since the late 1970s, Hong Kong's industry has been transferring its manufacturing activities to mainland China on a massive scale. At its peak in 1984, Hong Kong had a manufacturing workforce of 905,000 (41.7% of the active labour force); by 1995 those employed in the manufacturing sector had shrunk to 386,000 (15.3% of the Hong Kong workforce). The proportion of GDP generated by the manufacturing sector had also fallen from 24% in 1980 to 9% in 1995. To remain competitive in world markets, manufacturers in Hong Kong had to focus on higher value-added activities such as design, tooling, pilot production, manufacture of complex components, testing, marketing and distribution.

7.11 Whilst Hong Kong's manufacturers had responded quickly and successfully to changes and opportunities in the past decades, they needed additional support from the Government in order to move up-market. For this reason, the Government had pursued a consistent policy of upgrading Hong Kong's technological infrastructure and support services. The four schemes, namely the NTTS, the ARDS, the ISF and the CARDS, were established to support this policy.

### **NEW TECHNOLOGY TRAINING SCHEME**

#### **Origin of the NTTS**

7.12 In January 1988, the Administration considered that there was

## The Government's funding schemes for promoting technology development in industry

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a gap between the mature technologies which the local tertiary education and training institutions had imparted and the more recent technologies which were strategically important for the industrial development of Hong Kong. Therefore, in April 1988, a Working Party on Training in New Technologies, headed by the Director-General of Industry, was formed to examine the problem and to recommend how it might be resolved. The Working Party was required, having regard to the then prevailing arrangements for manpower training and the experimental Application-Specific Integrated Circuit (ASIC) training scheme (Note 3), to advise the Secretary for Trade and Industry and the Secretary for Education and Manpower whether or not there was a need for the Government to introduce additional measures in manpower training related to new technologies and, should there be such a need, to make proposals on these measures. The Working Party's Report was submitted to the Administration in January 1989 and its recommendations were generally accepted by the Administration.

7.13 The Working Party concluded that there were indeed limitations in the Government's manpower training programme at the technologist level and the Government should make additional provision for manpower training to help achieve its aims for enhancing industrial development. As the VTC, the ID and the HKPC were not equipped with the necessary working environment for learning the "experience-dominated" technologies, the Working Party considered that the training provision should take two forms: firstly, the provision of a placement service to help manufacturers locate training places and secondly, some form of financial assistance to help towards the cost of the training.

7.14 The Working Party recommended that:

- the Government should set up an NTTS with the aim of providing support to employers in potentially useful technologies that were rarely applied in Hong Kong;
- the best approach to the scheme was to leave it to manufacturers to decide which technology to go for and what type of training would be appropriate, with the Government

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**Note 3:** *The ASIC training scheme was introduced on the advice of the Industry Development Board for 1987-88 and 1988-89 to encourage local semiconductor firms and end-product manufacturers to invest in ASIC design equipment in Hong Kong. Under the scheme, employers could apply for a government training grant of up to \$52,000 towards the cost of sending an electronics engineer with some industrial experience overseas for initial or additional training in ASIC design.*

## The Government's funding schemes for promoting technology development in industry

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and the HKPC playing the facilitating roles. The role of the Government would be to draw manufacturers' attention to beneficial new technologies while the HKPC and the ID would assist manufacturers in effecting the placements for training; and

- the scheme should apply to the financing of applications for overseas courses or working attachments and local training courses, including relevant extension courses provided by the tertiary institutions and training courses provided by industry-support organisations such as the HKPC.

7.15 The training in new technologies envisaged by the Working Party was practical training rather than theoretical learning from textbooks and journals. The Working Party also estimated that the amount involved for each local and overseas training course would be, at 1988 price level, \$20,000 and \$50,000 respectively. Each local training course would last for about ten weeks while each overseas training course would last for about nine months.

7.16 In July 1991, the Administration sought the approval of the Executive Council (ExCo) that an NTTS should be established. The Scheme would have the following features:

- it would operate on a matching-contribution basis;
- the Government's contribution would be a grant of \$55 million from the Special Coin Suspense Account; and
- it would be administered by the VTC under the direction of the Secretary for Education and Manpower with the advice of the Industry and Technology Development Council (ITDC) (Note 4).

7.17 The Administration stated in the ExCo memorandum that:

- the ambit of the Scheme was to provide assistance to businesses in Hong Kong that wished to have their staff

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**Note 4:** *The ITDC is the Government's principal advisory body on matters relating to industry and technology development in Hong Kong. Membership of the ITDC includes senior government officials and non-officials from industry, commerce, finance and academia.*

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trained in a new technology that would be useful to their businesses;

- priority should be given to proposals that would transfer, through training, technologies associated with the diversification and upgrading of Hong Kong products, improvement in quality, productivity enhancement and value creation;
- the training could take the form either of an extension course offered by local and overseas institutions or of overseas working attachments in businesses where the technology was being applied;
- the rationale behind the overseas working attachments was that either the knowledge or technology to be gained was one that could not be taught formally, or that the technology was not known locally and to absorb it, close personal observation and hands-on experience were required. The knowledge was thus likely to be a specialised, company-specific or industry-specific nature; and
- the earnings generated from the investment of \$55 million from the Special Coin Suspense Account (see the second inset of paragraph 7.16 above) would allow grants of, on average, \$25,000 per overseas extension course or working attachment and \$10,000 per local extension course (Note 5), for an annual average of 70 trainees in each category, assuming the Government's grant was matched by the private sector.

7.18 The establishment of an NTTS was approved by the FC in May 1992. The Scheme was established in June 1992 with a capital sum of \$55 million. **The objective of the Scheme was to promote training in advanced technologies not available or not widely applied locally but which would be beneficial for the Hong Kong workforce to absorb.** In approving the Scheme, the FC was informed that the purpose of the Scheme was that, after the new technology was acquired by the trainees, the employers would hopefully put the new technology into

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**Note 5:** *On a matching contribution basis, each local and overseas training course would involve course fees of \$20,000 and \$50,000 respectively. They were the same as those stated in the Working Party's Report (see paragraph 7.15 above).*

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practice. It was also expected that the application of the technology would involve a great investment.

7.19 In April 1993, the FC further approved the injection of an additional capital sum of \$50 million into the NTTS, bringing the capital sum of the Scheme to \$105 million. The Scheme makes use of the investment income earned from placing the capital sum on bank deposits to meet the recurrent expenditure of the Scheme, comprising training grants and administrative expenses. The capital sum of \$105 million is held by the VTC for the Government under a trust deed arrangement.

### **Operation of the NTTS**

7.20 Under the Scheme, the Secretary for Education and Manpower might adjust the ceiling of grant per trainee from time to time in consultation with the Secretary for the Treasury. The ceilings on the grants were revised in June 1993 to \$15,000 for local training and \$37,500 for overseas training. By the end of December 1996, interest earned by the Scheme amounted to \$30.7 million, of which \$6.4 million (or 21% of the interest earnings) had been spent on training grants. As at May 1997, the Scheme had a surplus of \$22 million. As mentioned in paragraph 7.19 above, this surplus was to be used to meet payments of training grants and to meet the administrative expenses of the Scheme (Note 6).

7.21 In 1993, after conducting a survey of management development needs in the manufacturing sector, the VTC:

- streamlined the application process by pre-approving certain training courses for the purposes of training grants;
- allowed a company to submit more than one application for the same training course;
- maintained a list of new technologies that were fundable under the Scheme to facilitate the vetting of applications; and

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- stepped up the promotion of the Scheme by placing advertisement in bulletins, introducing the Scheme to various organisations related to the manufacturing sector and giving talks and sending promotional letters to employers in various sectors.

7.22 In order to promote the NTTS, in December 1996 the Administration sought ExCo's endorsement that:

- more efforts should be made to promote the Scheme and to make it clear that the Scheme covered not only manufacturing industries, but also the service sector;
- the ceilings for grants made under the Scheme should be removed because they were seen to be restrictive. Lifting the ceiling would encourage companies to provide intensive overseas training;
- subject to the FC's approval, the level of grant as a proportion of the total cost of a training course or attachment should be increased from 50% to 75%; and
- assistance should be extended to forms of training other than extension courses and working attachments, so long as they met the Scheme's objective.

In February 1997, the FC approved the increased level of grant. In approving the revised level of grant, the FC was informed that the Government would review the Scheme and its financial position 12 months after the implementation of the improvement measures. At the meeting, Members of the FC also commented that the Administration should assess whether the Scheme had achieved its objective rather than focusing only on the increase in grants. Various measures to improve the Scheme were implemented in mid-February 1997.

7.23 In June 1997, the EMB reported back to the FC that, after implementing the improvements for the first three months, the result

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**Note 6:** *With the implementation of the various improvements to the Scheme as mentioned in paragraphs 7.22 and 7.23 below, more training grants would be made in 1997-98.*

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was encouraging and in particular:

- a total of 900 applications, representing an increase of over 300% of the number of applications received before the improvements were introduced, was received following implementation of the improved measures;
  
- a total of 755 applications, involving disbursement of training grants in the amount of \$3.6 million, was approved for the first three months;
  
- the rate of increase in the number of overseas training courses was higher than that of local training courses; and
  
- employers had generally made good use of the Scheme to organise training courses for their staff in collaboration with local training institutions or by inviting overseas experts to Hong Kong.

7.24 Under the current procedures, all training courses, local and overseas, were vetted by the staff of the VTC and then submitted to the Sub-committee on Training in New Technologies (Note 7) of the VTC for approval. If necessary, advice from outside experts would also be sought. Although the average duration of a local training course was only three and a half days, it was in the opinion of the Sub-committee sufficient to acquire the necessary training in most new technologies.

7.25 In considering whether an application for a training course to be funded under the Scheme should be approved, the VTC's Sub-committee on Training in New Technologies would apply the following general criteria:

- whether the technology could be regarded as "new" and would benefit the local economic sector;
  
- whether the employer and the potential trainee could benefit

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**Note 7:** *The Sub-committee on Training in New Technologies is responsible for administering the NTTS, including evaluating and approving applications and monitoring and checking approved training programmes.*

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from the proposed training;

- the quality of the training programme; and
  
- the willingness of the employers to support the new technology in Hong Kong.

The Sub-committee also maintained a list of new technologies which met the above criteria and the list was periodically reviewed and updated.

### **Audit observations**

7.26 According to the January 1989 Report of the Working Party on Training in New Technologies (see paragraph 7.12 above), new technologies referred to any technology new to a recipient industrial society in respect of techniques, processes, products and production and management systems, the absorption and application of which would significantly benefit the industries of the recipient society, e.g. by enabling it to achieve greater efficiency, improved quality and more diversified output. The Working Party also considered that many of the technologies did not yet exist in Hong Kong and therefore recommended overseas working attachments, which might be preceded by local training on the application of the theories involved.

7.27 When additional capital was requested for the NTTS from the FC in April 1993, the Government estimated that, after the capital injection, the Scheme could provide 77 grants a year for each category of training, i.e. local and overseas training. Based on the maximum rates of grants of each local and overseas training course (\$15,000 and \$37,500 respectively), local training grants would each year amount to about \$1.2 million (\$15,000 x 77) and overseas training grants would amount to about \$2.9 million (\$37,500 x 77) (Note 8). Each year, the resources to be allocated would be about 29% for local training courses and 71% for overseas training courses. As it transpired, during the period from June 1992 to March 1997, 63% of the resources were allocated to local training

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**Note 8:** *Based on the average interest rate of about 4.75% per annum, the capital sum of \$105 million could generate interest income of about \$5 million a year. After allowing for administrative expenses of \$0.9 million, some \$4 million would be available for making training grants.*

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courses and 37% to overseas training courses, as shown in Table 1 below:

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Table 1

Comparison of estimated and actual amount of grants under the  
NTTS

	Local training (\$ million)	Overseas training (\$ million)	Total (\$ million)
Estimated amount of grants a year (Note)	1.2 (29%)	2.9 (71%)	4.1 (100%)
<b>Actual grants approved:</b>			
June 1992 to March 1993	nil (0%)	0.2 (100%)	0.2 (100%)
1993-94	0.1 (25%)	0.3 (75%)	0.4 (100%)
1994-95	0.9 (69%)	0.4 (31%)	1.3 (100%)
1995-96	1.4 (67%)	0.7 (33%)	2.1 (100%)
1996-97	<u>2.1 (66%)</u>	<u>1.1 (34%)</u>	<u>3.2 (100%)</u>
<b>Total (June 1992 to March 1997)</b>	<b><u>4.5 (63%)</u></b>	<b><u>2.7 (37%)</u></b>	<b><u>7.2 (100%)</u></b>

Source: VTC's records

Note: Based on the FC paper of April 1993, 77 local training grants (with maximum grant of \$15,000 for each course) and 77 overseas training grants (with maximum grant of \$37,500 for each course) would be provided.

7.28 As advised by the VTC, employers had preferred local training to overseas training because:

- for overseas training, employees would have to be away from work for a much longer period;
- local training courses in recent years were of high quality and were very often conducted by overseas experts;
- local training courses were less expensive; and
- with local training, post-training consultation which was

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essential to the trainees for implementing the acquired technology was more readily available.

7.29 Audit agrees that, from the management point of view, it is easier to provide for local training courses. However, the Administration originally intended and also advised ExCo in 1991 (see the last inset of paragraph 7.17 above) and the FC in 1992 and 1993 that more financial resources were to be provided for overseas training grants. The importance of overseas training, especially working attachments, as opposed to local training, was also made clear in the ExCo memorandum. However, Audit observed that much more resources were allocated for local training courses (see Table 1 above). Audit therefore considers that there is a need to review whether more resources should be allocated for overseas training courses in order to help manufacturers acquire knowledge of a specialised, company-specific or industry-specific nature (see the fourth inset of paragraph 7.17 above).

7.30 The training activities on new technologies as envisaged by the Working Party in its report of January 1989 were to be comprehensive and practical training courses which would involve a longer duration and entail substantial investment (see paragraph 7.15 above). ExCo was also informed in 1991 that each local and overseas training course would involve, on average, government grants of \$10,000 and \$25,000 respectively (see the last inset of paragraph 7.17 above). However, Audit observed that courses currently funded under the NTTS were of much shorter duration and that individual training grants were far below the levels estimated in 1988. According to the VTC's records, a local training course had an average duration of three to four days only and most overseas training courses lasted for less than ten days and many overseas training courses were not working attachments. This deviated significantly from the original intention that it would take "weeks and months to complete the training", as envisaged in the Working Party's Report. Furthermore, the actual training grants under the Scheme were on average \$3,400 and \$13,600 for local and overseas training respectively (Note 9). They were far below the estimated levels of \$10,000 and \$25,000 as indicated in the 1991 ExCo memorandum and were much lower than the ceilings of \$15,000 and \$37,500 for local and overseas training set in 1993 (see paragraph

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**Note 9:** *Up to December 1996, there were 1,114 approved local training applications and 186 approved overseas training applications involving grants of \$3.83 million and \$2.53 million respectively. Hence, on average, the training grant for each local training was about \$3,400 ( $\$3.83 \text{ million} \div 1,114$ ) and for each overseas training was about \$13,600 ( $\$2.53 \text{ million} \div 186$ ).*

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7.20 above). As most of the training courses funded under the Scheme were of much shorter duration and the training grants were of much smaller amounts, it is doubtful whether these courses could offer the kind of comprehensive and practical training on new technologies as originally envisaged and whether they could meet the objective of the Scheme. In this connection, the FC had commented on the need to ensure that the objective of the Scheme was achieved (see paragraph 7.22 above).

7.31 Audit considers that there is a need to review the duration of training courses and the suitability of the courses for acquiring new technologies. According to the Government's expectations, these courses should be beneficial to the employers because, after attending the courses, their employees would contribute to achieving greater efficiency, improved quality and more diversified output (see paragraph 7.26 above).

7.32 Whilst a system was in place for approving applications for training grants (see paragraph 7.24 above), Audit observed that the VTC had not conducted periodic follow-up reviews on whether the technologies acquired by the employees were useful to their work and had been applied to their business. In response to Audit's enquiry, the VTC advised that:

- employers participating in the NTS were not required to commit themselves to invest on particular technologies beforehand;
- the trainees were also not required to undertake to work in the related field for a certain period following training;
- it was inappropriate and impractical for the VTC to ensure that technologies acquired had been applied to industry, in particular when most of the local training grants were of a small amount; and
- for training grants of large amounts such as the newly introduced tailor-made local training courses, there was a built-in requirement in the application form requiring employers to submit their detailed implementation schedule of the acquired technology before such applications would be considered.

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7.33 Audit considers that for training grants involving substantial amounts, such as those for overseas training and those under the newly introduced tailor-made local training courses, there is a need to ensure that the acquired technology will be effectively applied to the companies which employ the trainees. The FC was informed that the purpose of the Scheme was for the employers to put the new technology acquired by the trainees into practice (see paragraph 7.18 above). A mechanism should be in place to ensure the achievement of the objective of the Scheme that the training is beneficial to Hong Kong.

#### Audit recommendations

7.34 As the Administration had undertaken to carry out a review of the Scheme in early 1998, 12 months after the implementation of the various improvement measures (see paragraph 7.22 above), Audit has recommended that the Administration should, in its review, consider:

- increasing the resources to be allocated for overseas training courses in order to help manufacturers acquire knowledge of a specialised, company-specific or industry-specific nature (see paragraph 7.29 above);
- assessing the duration of training courses and the suitability of the courses for achieving the objective of the Scheme (see paragraph 7.31 above); and
- taking necessary measures to follow up major training grants to ensure that the new technologies acquired will be effectively applied to industry (see paragraph 7.33 above).

#### Response from the VTC

7.35 The Executive Director, VTC has said that the audit recommendations are generally acceptable to the Council. He has also said that:

- the Sub-committee on Training in New Technologies at its meeting held on 29 August 1997 decided that for major training grants, the VTC's professional staff should interview the trainee and his employer six months after the training to ascertain whether the technology acquired had

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been applied. Arrangements are being made to implement this decision; and

- the Sub-committee on Training in New Technologies has undertaken to review the NTTS in February 1998 and will take into account the audit recommendations when planning the review.

**Response from the Administration**

7.36 The **Director-General of Industry** has said that:

- he supports Audit's recommendation that the Administration should take necessary measures to follow up major training grants to ensure that the new technologies will be effectively applied to industry;
- he has no problems with Audit's recommendation to assess, in the forthcoming review on the NTTS, the duration of training courses and the suitability of the courses for achieving the objective of the Scheme;
- concerning Audit's recommendation that more resources should be allocated for overseas training courses, the purpose of the NTTS is to provide assistance to companies in Hong Kong to train their staff in a new technology which would be useful to their business. The employers are in a much better position to decide which technology and which format of training would be most appropriate to address their needs. Besides, he considers that only the employers know when and how long they can release their staff to attend training. While the Sub-committee on Training in New Technologies should help, if requested, to obtain necessary information or contacts for overseas training, it should not be held responsible for identifying overseas training for Hong Kong companies; and
- he believes the fact that more local training courses are approved under the NTTS only reflects the reality that more employers have opted to train their staff locally rather than overseas. Having said that, he has no problems with Audit's suggestion to review whether more resources should be allocated for overseas training courses.

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7.37 The **Secretary for Education and Manpower** has said that he generally agrees with the views of the Director-General of Industry and the Executive Director, VTC. He has also said that:

- he has no problems in subsuming under the review of the NTTS, scheduled in February 1998, Audit's recommendations of assessing the duration of training courses and the suitability of the courses for achieving the objective of the Scheme and taking necessary measures to follow up major training grants (see the second and third insets of paragraph 7.34 above); and
  
- concerning the audit recommendation that the Administration should, in the forthcoming review of the NTTS, consider increasing the resources to be allocated for overseas training courses, both he and the VTC were of the view that both overseas and local training are effective in facilitating the transfer of new technologies. They should let employers decide the type of training they want and allocate resources accordingly. Indeed, there is no evidence to suggest that the smaller number of applications for overseas training grants from employers is the result of insufficient resources under the NTTS, or the imbalance in allocating resources between local and overseas training. Since the present arrangement under the NTTS is meeting the demand of industry, the idea of allocating more resources for overseas training will not by itself help boost the number of applications for overseas training grants.

### **APPLIED RESEARCH AND DEVELOPMENT SCHEME**

#### **The development of the ARDS**

7.38 In November 1989, the Industrial Technology Committee of the then Industry Development Board (Note 10) completed a study entitled "Applied industrial research". For the purposes of the study, the Committee defined applied industrial research as work on developing and adapting known technologies for use in industry. In January 1990, the Committee reported to the Industry Development Board that:

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- a higher level of private and public sector investment in applied industrial research was a necessary condition for the satisfactory development and increased profitability of Hong Kong's manufacturing industries; and
  
- the public sector had to exercise a much greater leadership role by developing a strategic view of Hong Kong's technological future and by reducing the initial risks for those manufacturers willing to undertake applied industrial research.

7.39 After considering the Industrial Technology Committee's report and reviewing the Government's industrial policy, in December 1990, the Industry Development Board recommended that the Government should provide some form of funding support, by way of matching grants for new technology-based operations, to lower the entry barrier of developing new technologies or products and to encourage wide application of research and development in industry.

7.40 In July 1991, ExCo decided that an applied research and development assistance scheme should be established. The scheme was to provide grants to companies to undertake applied research and development in Hong Kong. The grants could be up to half of the total costs of approved projects and the companies would be required to spend comparable sums to match the grants. It was estimated that a sum of \$200 million could be required during the first five years. In December 1991, the FC approved a sum of \$200 million from the Capital Investment Fund for setting up the ARDS.

7.41 According to the FC paper of December 1991, the ARDS was to be operated by the Director-General of Industry, with the advice of the ITDC, within the framework of the following basic principles:

- (a) locally registered companies undertaking applied research and development in Hong Kong were eligible to apply for funding support under the ARDS;
  
- (b) the ARDS would provide funding support for technologically innovative projects that had the potential to yield

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**Note 10:** *The Industry Development Board was the Government's advisory body on industrial policy. It was replaced by the ITDC in January 1992.*

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commercially exploitable results;

- (c) there should be no discrimination against any particular sectors or technologies because innovation could occur in traditional as well as technology-intensive industries;
- (d) the ARDS could provide up to half of the funding required for approved projects. The applicants would have to provide the balance of funds required. This requirement for matching private sector investment should help to ensure that projects were basically market-driven and that applicants were committed to bringing the projects to fruition;
- (e) funds would be used to cover mainly applied research and development manpower, equipment and materials; and
- (f) companies funded under the ARDS would be required to enter into a contract with the Government to ensure that the Government's rights were appropriately protected and that the Government's liability was limited.

7.42 The submission to the FC also stated that the Government would seek a return of at least 5% per annum on the sum advanced to the ARDS. In March 1992, a Committee on the Applied Research and Development Scheme was formed under the ITDC to advise on the operational details of the ARDS. In November 1992, after considering the deliberations of the Committee, the ITDC recommended that:

- the Government's investment under the ARDS should take the form of equity participation or a loan which could be converted to equity where appropriate, or a combination of both; and
- the Government's investment under the ARDS should be held and managed by a private limited company which would be wholly-owned by the Government through the Financial Secretary Incorporated.

The FC approved the revised arrangement to the Scheme in December 1992.

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7.43 The Hong Kong Applied R&D Fund Company Limited, with secretariat support provided by the ID, was formed in February 1993 to operate the ARDS. This company was renamed as the Applied Research Council Company Limited in May 1995 and was further renamed as the Applied Research Council (ARC) in June 1996. In 1994, the Company carried out a review of the ARDS after it had been in operation for one and a half years. The major findings of the review were:

- the ARDS was well publicised and there was widespread interest in undertaking applied research and development work. This might be evidenced by the number of enquiries about the ARDS; and
- the various conditions attached to the funding support helped to safeguard the prudent use of funds but were also the main factor inhibiting the translation of interest into real applications.

7.44 Based on the recommendations of the Company, the ITDC agreed to introduce the following measures for the Scheme:

- equity participation would become the usual form of funding support;
- in cases where funding support was in the form of a loan, more flexibility would be exercised in determining the interest rates;
- the scope of funding would be extended to cover other items such as marketing;
- the funding ceiling of \$10 million for each project and for each company would be applied flexibly; and
- borrowers would no longer need to charge their assets to the Company provided that other forms of safeguard such as personal guarantee met the satisfaction of the Board of the Company.

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7.45 In June 1995, the FC approved an increase in the maximum level of funding support for each project approved under the ARDS from 50% to 75% of the fundable costs incurred in order to make the Scheme more attractive.

### **Objective of the ARDS**

7.46 As mentioned in paragraphs 7.39 and 7.40 above, the objective of the ARDS was to increase the then limited volume of applied research and development activities in Hong Kong by providing government funding as a catalyst. The longer-term aim was to increase the technological capability and competitiveness of local industry. The Government's support under the ARDS would only be provided for technologically innovative projects that had the potential to yield commercially exploitable results. In order to ensure that the Scheme was used for investing in worthwhile applied research and development projects, each project proposal was to be assessed by an internal assessor and two external assessors who should be experts in the particular industry. On the basis of their findings, a recommendation to support or reject the proposal would be made by the ARC to the Board of Directors. The Board would then decide on approving or rejecting the proposal. The Government's investment on each approved project would take the form of equity participation in the recipient company, or a loan or a combination of both.

7.47 The allocation of \$200 million from the Capital Investment Fund to the ARC was treated as an investment by the Government in the ARDS. While no fixed interest was payable by the ARDS in respect of this investment, the Government expected a return of 5% a year on the sum advanced. The 5% rate of return was set taking into account that there were risks inherent in research and development work and that the Government might not be able to recoup its investment in all supported projects.

7.48 Audit found the following inadequacies in the operation of the ARDS:

- the number of projects assisted under the ARDS was lower than expected (see paragraphs 7.49 and 7.50 below);
- the success of some completed projects was questionable (see paragraphs 7.51 and 7.52 below);

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- excessive funds were held by the ARC (see paragraph 7.53 below); and
- there was inadequate assurance that the required share of fundable costs had been contributed from non-government sources (see paragraphs 7.54 to 7.56 below).

**The number of projects assisted under the ARDS was lower than expected**

7.49 In December 1991, the FC approved the transfer of a sum of \$200 million from the Capital Investment Fund to the Scheme. At the time, it was estimated that the ARDS would on average assist 20 projects a year with each project requiring funds of \$1 million to \$3 million. However, for the four years (from February 1993 to March 1997) since the commencement of operation of the Scheme, only 19 projects (Note 11) (a total of 65 applications had been received) were approved under the Scheme, representing 24% of the estimated number of 80.

7.50 Because only 35 applications had been received in the first two years of operation, both the Hong Kong Applied R&D Fund Company Limited and the ITDC considered that the rather disappointing response was due to the limited level of funding support provided. In order to make the Scheme more attractive to potential applicants, the Director-General of Industry proposed to raise the maximum level of government financial support from 50% to 75% of the fundable costs of an approved project. The proposal was approved by the FC in June 1995 (see paragraph 7.45 above). An audit examination of the number of applications received however revealed that since revising the level of government support, there was no significant improvement in the response to the Scheme, as shown in Table 2 below:

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**Note 11:** *Excluding four projects which had been approved but were subsequently withdrawn.*

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**Table 2**

**Applications received under the ARDS  
for the period from February 1993 to March 1997**

<b>Period</b>	<b>Number of applications</b>
<b>Before June 1995:</b>	
February 1993 to December 1993	19
January 1994 to December 1994	13
January 1995 to May 1995	<u>3</u>
Total (for a period of 28 months)	35 ==
	<b>Average: 1.3 applications per month</b>
<b>After June 1995:</b>	
June 1995 to December 1995	10
January 1996 to December 1996	18
January 1997 to March 1997	<u>2</u>
Total (for a period of 22 months)	30 ==
	<b>Average: 1.4 applications per month</b>

Source: ID's records

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### Success of some completed projects was questionable

7.51 The objective of the ARDS was to provide funds to assist applied research and development projects that had the potential to yield commercially exploitable results. Funds were given either as a loan or through equity participation. Of the 19 projects approved from February 1993 to March 1997 (see paragraph 7.49 above), 17 projects received loans and 2 received equity participation. One project, involving a loan of \$0.3 million which was fully repaid, was abandoned. Nine projects had been completed, five of which were due for loan repayment (Note 12). Among these five projects:

- three companies requested a deferment of the repayment of the loans by one to two years;
- one company declared that it was unable to repay the loan and was going to wind up the company; and
- one company started to repay the loan on schedule.

As four companies were unable to repay the loans on schedule, it is doubtful whether the projects undertaken by these companies can be regarded as successful. Details of the five projects are given below:

- **Development of an environmentally friendly packaging material.** The ARC approved a loan of \$0.9 million for this project, which was 50% of the total project costs, to the recipient company to develop an environmentally friendly packaging material. The ARC also held 10% equity of the recipient company. The company had drawn down \$0.9 million of the loan. Interest rate was set at prime rate and repayment was scheduled to begin in December 1996. There was no third party who guaranteed the repayment of the loan but the ARC had a fixed charge over the recipient company's business and book debts, and a floating charge over its assets. The project progressed satisfactorily until late 1995 when the ID reported that the recipient company had difficulty in securing outside investment in the development of the product. In January 1997, the recipient company

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informed the ID that it would not be able to repay the loan. The major problem was product failure as the packaging material which the company developed had a leakage problem. The company is meanwhile considering winding up. The ARC may need to write off the loan made to the company;

- ***Development of an integrated circuit for long-range cordless phone using the spread spectrum technology (Note 13).*** In November 1993, the ARC approved the provision of a convertible loan of up to a maximum amount of \$10 million to the recipient company for developing an integrated circuit for long-range cordless phone by using the spread spectrum technology. Of the total loan facility, an amount of \$5.5 million had been drawn down by the recipient company. In accordance with the loan agreement, the recipient company was required to repay the outstanding loan by 36 equal consecutive monthly instalments from July 1995. The loan was personally guaranteed by all the four directors of the company. Although the managing director of the recipient company claimed in 1995 that the project was successfully completed, the product delivered could not generate much income. 80% of the company's income was from bank interests. The ID's assessors also considered that the product delivered was technically flawed in a number of aspects, making it difficult to compete with other similar ones emerging in the market. The recipient company started to repay the loan by instalments in September 1995. After repaying eleven instalments, the company made a request in November 1996 to the ARC for deferring repayment by ten months. This was because the company had a serious cash-flow problem arising from the unexpected volatility and keen competition in the market for high technology wireless products. Loan repayment only resumed in May 1997;
  
- ***Development of a computer-aided design software package.*** The project involved the making of a convertible loan of \$2.7 million to the recipient company to develop a computer-aided design software package. In May 1995, the ARC was informed by the recipient company that the sales of the software package were not satisfactory. The company admitted that,

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**Note 12:** *Among the remaining four projects, three projects were not yet due for repayment and one project involved a loan of \$1 million which was fully repaid ahead of schedule.*

**Note 13:** *Spread spectrum technology is a coding technique for digital transmission. By using spread spectrum technology, the reliability and capability of wireless telephone will be enhanced since signals can be transmitted over a longer distance and are resistant to interference and jamming.*

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although it had sold 1,400 copies of the software at a unit price of about \$3,800 during the period from July 1991 to March 1995, it had suffered a loss because of the large discount of 50% to 60% offered to dealers and distributors and of the high marketing expenses. Owing to its poor financial position, the company was unable to repay the monthly instalments when they became due in December 1995. A loan restructuring proposal was made by the company in 1996. It was agreed that the company would start to repay \$20,000 each month starting from April 1997. Notwithstanding this, the company still could not meet the revised repayment schedule;

- **Development of a network fax system.** The project involved the provision of a loan of \$0.4 million in 1995 to the recipient company for the development of a network fax system. The recipient company expected that the software could be installed in 150 network systems in Hong Kong. The project was completed in February 1995. Repayment of the loan was scheduled to start in May 1996. The recipient company however requested an extension of the grace period for loan repayment by one year due to tight cash flow and heavy marketing expenditures. The company considered that the product had met with reasonable success only and since its launch in May 1995, 70 users had been using the software. Loan repayment started in May 1997; and
  
- **Development of a specialised computer software for quantitative environmental assessment.** The project involved the development of two computer software packages for quantitative air pollution and risk assessment. In March 1994, the ARC approved a loan of \$4 million to the recipient company. The project was originally planned to commence in August 1993 and was expected to be completed by December 1994. Subsequently, the recipient company revised the commencement date to July 1994 and the completion date to December 1996. Eventually, the recipient company had only drawn down \$1 million of the approved loan. It commenced repayment of the loan in August 1997 as scheduled. In April 1996, the recipient company informed the ARC that up to April 1996, the income related to one of the software packages was \$2.8 million. This was generally in line with the estimate provided by the recipient company to the ARC in February 1994. However, the ARC had not received any further information on the progress of the project since April 1996.

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7.52 The fact that four of the above five projects turned out to have encountered difficulties in marketing their products and were unable to repay the loans on schedule reflected that there were doubts on the commercial exploitability of the research and development results and the viability of the projects.

**Excessive funds held by the ARC**

7.53 In December 1991, when the FC approved an allocation of \$200 million from the Capital Investment Fund to set up the ARDS, it was stated in the FC paper that the Director-General of Industry would prepare an annual budget for clearance within the Administration to ensure a reasonable cash flow. However, starting from 1993-94 onwards, funds were advanced quarterly each year from the Capital Investment Fund to the ARC. By the end of 1996-97, the Government had injected \$151 million of the \$200 million into the ARC, as follows:

<b>Financial year</b>	<b>Amount injected (\$ million)</b>
1993-94	24
1994-95	38
1995-96	40
1996-97	<u>49</u>
<b>Total</b>	<b><u>151</u></b>

*Source: Government's records*

According to schedule, the remaining \$49 million will be injected into the ARC in 1997-98. An audit of the financial position of the ARC as at 31 March 1997 revealed that funds amounting to \$129 million were held by the Council, which was four times its outstanding commitments of \$31 million, as detailed below:

	<b>(\$ million)</b>
Total commitments for 19 approved projects	65

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less: Amount already advanced to recipient companies	(34)
Outstanding commitments	<u>31</u>

Source: ID's records

Audit observed that the ARC placed funds in excess of requirement on bank deposits which earned interests of about 7% per annum and that interests earned from such deposits were accrued to the Scheme. However, the ARC was only required to pay 5% per annum on the amount advanced from the Capital Investment Fund (see paragraph 7.47 above).

**Control weakness in releasing funds to recipient companies**

7.54 Under the ARDS, funds would be released to recipient companies by instalments on a reimbursement basis, up to 75% (or 50% before June 1995) of the fundable costs incurred by recipient companies. The level and mode of funding support together with the terms and conditions were determined by the Board of Directors of the ARC and agreed with recipient companies at the project proposal stage. Legal documents were prepared and signed to protect the interests of all parties.

7.55 As the project proceeded, the recipient company would draw on the approved funds in accordance with the terms and conditions stipulated in the relevant agreement. For each loan "draw down", the recipient company would send a notice of loan "draw down" together with supporting documents such as payment invoices to the ID. The ID would then perform checking and seek the internal or external assessors' comments on the project progress. Afterwards, the ID would reimburse the recipient company with the payment.

7.56 **Inadequate assurance that the required share of fundable costs had been contributed from non-government sources.** Audit noted that when the Government reimbursed a recipient company for the Government's share of fundable costs through each loan "draw down", the recipient company was only required to produce documentary evidence to support the company's claim for the Government's share of fundable costs. It was not required to produce documentary evidence to show that it had also received the agreed portion of the fundable costs from non-government sources.

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As a result, Audit could not ascertain whether the claim was proper or not because of the lack of evidence indicating whether the company had received matching contribution from non-government sources for their share of fundable costs. Examples are shown below:

- the recipient company (which eventually had problems in loan repayment) submitted in March 1994 a loan "draw down" notice for \$0.8 million (\$0.7 million on manpower costs and \$0.1 million on equipment costs). This sum was advanced to the company in March 1994 by the ARC. Audit noted that the recipient company only provided documentary evidence to support the claim of \$0.8 million from the Government, but no evidence was produced to show that it had borne its own share of fundable costs. To support its matching contribution of \$0.85 million, the company only provided the ARC with copies of two bank pay-in slips which were dated October 1993 and November 1993 respectively; and
  
- in another case involving the development of an alarm signalling security system, the ARC approved a loan of \$570,000 to the recipient company. In October 1994, the company submitted a loan "draw down" notice to draw down \$285,000. It only provided documentary proof to support fundable costs of \$468,824 incurred. According to the then prevailing rules of the ARDS, the Government's contribution would only be 50% of fundable costs and accordingly, the recipient company should have provided documentary proof for \$570,000 (i.e. \$285,000 x 2) in order to draw down \$285,000. The requested amount was nevertheless released to the company on 1 November 1994. This project was eventually abandoned and the company had repaid the loan and interest to the ARC.

Audit could not ascertain in the above two cases whether the recipient companies had received the agreed share of fundable costs from non-government sources. **Audit considers that there is a risk that the Government might be financing over 75% (or previously 50%) of the fundable costs of the project. As a result, the Government might be bearing more than its intended share of the risk.**

### Audit observations

7.57 The objective of the ARDS was to use government funding as a catalyst to enable more research and development work to be undertaken by the private sector. The Government expected to obtain

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a return of at least 5% a year on the capital advanced to the Scheme. Funding support would only be provided for research and development projects that were basically market-driven and had the potential for commercial exploitation. The longer-term objective of the ARDS was to increase the technological capability and competitiveness of local industries. However, Audit noted that up to March 1997, the ARDS had rendered support to just 19 projects and four completed projects (out of five) had encountered difficulties in loan repayment. Evidence that these four projects had generally delivered commercially exploitable results is lacking. Therefore, it is questionable whether they can be regarded as successful projects.

7.58 The increase of the Government's funding support from 50% to 75% did not help promote the use of the ARDS. Because the number of projects assisted under the Scheme represented 24% of the target, substantial amount of surplus funds were held by the ARC. Furthermore, the existing procedures for releasing funds to recipient companies did not provide adequate assurance that recipient companies had received the agreed share of the fundable costs of the projects from non-government sources.

7.59 Audit noted that in December 1991 when approval from the FC was sought for setting up the ARDS, the Director-General of Industry undertook to conduct a comprehensive appraisal of the Scheme at an appropriate time. In June 1992, the ID also laid down a number of parameters for future appraisal of the Scheme. These were endorsed by the ITDC. The parameters included, among other things:

- number of applications received;
- number of worthwhile project proposals approved for funding support;
- amount of private sector research and development generated;
- intellectual property rights (e.g. patents and designs) developed; and
- sales revenue attributable to new processes/products developed.

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7.60 Although the ARC conducted a review of the Scheme in 1994 (see paragraph 7.43 above), there had not been any appraisal of the Scheme using the above parameters until March 1997 when the ID commenced a review of the Scheme. The review aims to cover the following issues:

- whether the Scheme has been able to encourage more research in the private sector, and reasons for its success and failure;
- whether the present scope of funding and the current funding criteria are appropriate;
- whether the present vetting, funding criteria and monitoring mechanisms are sufficient and whether there can be any further streamlining; and
- other issues related to the administration of the Scheme.

It is expected that the review report will be available in September 1997. In response to Audit's enquiry, the ID disagreed that there had not been any appraisal of the Scheme until March 1997. The Department informed Audit that a review was carried out in 1994 and a number of new measures were introduced for the ARDS. It might not have been a comprehensive review as the ARDS had only been in operation for less than two years then, and none of the funded projects had then been completed.

### **Audit recommendations**

7.61 Audit has *recommended* to the Director-General of Industry that in his review he should, having regard to the audit observations above:

- examine the effectiveness of the ARDS in providing support to applied research and development projects. This examination should include an appraisal of the Scheme using the parameters laid down in June 1992 (see paragraph 7.59 above);

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- consider whether there is a need for revising the Scheme with a view to meeting its objective more effectively;
- consider setting up procedures to assess the cash-flow requirements of the ARC before funds are transferred to the Council from the Capital Investment Fund in future; and
- revise the procedures for releasing funds to recipient companies in order to ensure that the required share of fundable costs is contributed from non-government sources.

**Response from the Administration**

7.62 The **Secretary for the Treasury** has said that he will consider the cash-flow requirements of the ARC before transferring funds to it in future.

7.63 The **Director-General of Industry** has accepted the audit recommendations. He has said that:

*The number of projects assisted was lower than expected (see paragraphs 7.49 and 7.50 above)*

- (a) he agrees with Audit's views. The major reason for the low number of approved cases is that the ARC has not received sufficient number of quality applications. In fact, there are so far 67 applications and the total amount requested is \$366.5 million, which far exceeds the \$200 million available under the ARDS. Unfortunately, many of them were considered to be not worthy of support by the assessors and the ARC, either because the projects themselves lack technological merits or commercial potential, or the applicant companies lack the technical or management capabilities;
- (b) the ARC has thus only approved loans/equity injection for 23 cases. As four of these cases subsequently withdrew their applications, only 19 cases have received funding support. There is little the ARC can do on the quality of applications;
- (c) notwithstanding this, the ARC will step up publicity to

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increase public awareness of the ARDS. At present, publicity is done through advertisements, distribution of information leaflets, the Internet, as well as talks and briefings for industry associations and prospective applicants. There is scope for more to be done and the details are being worked out;

***Success of some completed projects was questionable (see paragraphs 7.51 and 7.52 above)***

- (d) all business ventures carry risks. Technology ventures are by their very nature more risky. To expect too high a success rate is not entirely realistic. In fact, the inherent risks in research and development were stated clearly in the FC paper when funding was sought in 1991 to set up the Scheme;
- (e) notwithstanding the four cases highlighted in Audit's review, there are several other cases (completed after 31 March 1997) which have demonstrated initial commercial success. One of them is so successful that the company has actually repaid the loan in full in one go. Another successful project has also started repayment and is contemplating a similar one-off repayment (Note 14);

***Excessive funds held by the ARC (see paragraph 7.53 above)***

- (f) the ID provides an estimate of the "draw down" schedule to the Finance Bureau of the Government Secretariat annually for the preparation of the Estimates which, he believes, has met the primary purpose of the FC's requirement for an "annual budget" ;
- (g) the money held by the ARC is managed in accordance with the guidelines set down by the Hong Kong Monetary Authority. For instance, they are placed in different accounts in five banks for risk diversification. All interests earned are accrued

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**Note 14:** As mentioned in paragraph 7.51 above, four out of five completed projects which were due for loan repayment had requested a deferment of loan repayment or had declared that they were unable to repay the loans. Audit therefore considers that the success rate of ARDS projects was on the low side.

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to the ARDS, and the account is audited each year. There is no financial loss to the Government whether the money is held by the Government or by the ARC;

- (h) neither the ID nor the ARC is given funding to meet the recurrent expenses of the ARDS, including legal fees, audit fees, assessment fees, publication and advertising expenses. The interests earned from the cash held by the ARC are used to meet these expenses, lest it would need to deplete the capital amount for these recurrent purposes (Note 15);
- (i) the ID will, together with the Finance Bureau, consider the feasibility of drawing down the ARDS's capital on a requirement basis; and

***Control weakness in releasing funds to recipient companies (see paragraphs 7.54 to 7.56 above)***

- (j) he agrees that this can be a problem, as proof of the recipient companies' contribution is normally not required, except in one case. The ID would raise this issue with the ARC and consider ways to improve the control aspect.

7.64 The **Director-General of Industry** has also said that:

- he agrees that a review on the effectiveness of the ARDS is necessary. In fact, such a review is being carried out. The parameters laid down in 1992 would be included as far as possible; and
- he has noted that there can be difficulties with the appraisal of the Scheme using some of the parameters laid down. For instance, some companies may not wish to disclose their sales revenue for reasons of commercial sensitivity. This is particularly the case for those which have no problems in repayment.

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**Note 15:** *Audit noted that for the period from February 1993 to March 1997, the ARC had earned interests of \$13.7 million from bank deposits. This was some five times the recurrent expenses of the ARDS which amounted to \$2.5 million for the same period.*

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### INDUSTRIAL SUPPORT FUND

#### Establishment of the ISF

7.65 In the early 1990s, Hong Kong's manufacturing industries were evolving from the use of labour-intensive methods of production to more sophisticated methods based on technological development. Therefore, they needed additional support from the Government in the restructuring process. There was increasing pressure from the industrial sector and the ITDC for the Government to allocate more funds to support industrial technology development activities. Therefore, in February 1993, ExCo approved that funds released from the reduction in the annual recurrent subvention to the Hong Kong Trade Development Council (as a result of adopting a revised subvention formula for the computation of the subventions payable to the Council) would be redeployed to support the industrial technology programme.

7.66 In November 1993, the FC approved the creation of a new Capital Account block vote under the General Revenue Account (GRA) for industrial support as from April 1994 onwards. An initial allocation of \$180 million was provided for 1994-95. The block vote would finance projects which the ID, on the advice of the ITDC, considered beneficial to the industrial or technological development of Hong Kong. Various industry-support bodies e.g. the ID, the HKPC, trade and industrial associations, tertiary institutions, professional bodies and research institutes could seek funding support from this block vote. Private companies could also seek funding support from the block vote so long as they could show that their projects would benefit a particular industrial sector or would benefit the manufacturing industries at large. The objective of the block vote is to support the Hong Kong manufacturers to move up-market and into higher technology production while the Government would continue to maintain a fundamentally non-interventionist economic policy. This block vote for industrial support was renamed as the ISF in January 1995.

7.67 Projects under the ISF were normally financed in the form of grants. These projects might be capital in nature, such as purchase of equipment, establishment of new technology demonstration centres and commissioning of consultancy studies. The projects might also be recurrent in nature and funding was required from the block vote to cover the recurrent expenses, such as manpower and other administrative costs, but such projects should only involve subsidy in the form of grants for a specified period, after which the project should become self-financing.

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7.68 Each year, the ID would invite eligible organisations to submit applications under the ISF. The ID would conduct a preliminary vetting and assessment of all applications received. The relevant committees or sub-committees of the ITDC would be consulted on projects falling under their respective purview. Recommendations would then be formulated by the ID for consideration by the Projects Vetting Committee (PVC) which is chaired by the Director-General of Industry with the various Chairmen of the committees as members. With reference to the PVC's recommendations, the ITDC would support the proposals or otherwise. Based on the ITDC's advice, projects would be approved for commitment under the ISF. The Director-General of Industry was delegated the authority to approve expenditure under the ISF for small to medium-sized projects, costing up to the same ceiling as Category D projects in the Public Works Programme (currently \$15 million). Individual projects under the block vote costing more than the Category D ceiling would have to be submitted to the FC for funding approval.

7.69 For the years from 1994-95 to 1996-97, the approved provisions and actual expenditure of the ISF were as follows:

	Approved provision (\$ million)	Actual expenditure (\$ million)
1994-95	180	176.3
1995-96	210 (see Note	209.5
1996-97	<u>250</u>	<u>249.5</u>
<b>Total</b>	<b><u>640</u></b>	<b><u>635.3</u></b>

Source: ID's records

Note: This figure does not include the \$50 million transferred to the CARDS.

By the end of 1996-97, total commitments in respect of grants approved under the ISF amounted to \$766 million (Note 16), involving

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**Note 16:** By the end of 1996-97, 207 projects had been approved involving total grants of \$766 million, \$635.3 million of which had been disbursed to the recipient organisations.

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a total of 207 approved projects, 68 projects of which were completed. These 68 projects involved funds of \$115 million. They are summarised below:

	<b>Number of projects</b>	<b>Funds disbursed</b>  <b>(\$ million)</b>
Major ISF projects (project value over \$2 million)	14	82
Minor ISF projects (project value less than \$2 million)	54	33
<b>Total</b>	<b><u>68</u></b>	<b><u>115</u></b>

Source: ID's records

### **Examination of ISF projects**

7.70 Audit examined the 14 completed major projects (see paragraph 7.69 above). Audit also examined the Telecommunications Product Technology Centre project, which had not yet been completed, because the Centre involved a grant of \$84 million from the Scheme, representing 11% of the total grants approved. The Centre had a project duration of three years, which was extended by two years. The following inadequacies in the operation of the Scheme were observed:

- departure from the ambit of the ISF (see paragraphs 7.71 to 7.80 below);
- inadequate monitoring of the Telecommunications Product Technology Centre (see paragraphs 7.83 to 7.91 below);
- lack of adequate action to follow up project benefits (see

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paragraphs 7.94 to 7.98 below); and

- actions taken to deal with surplus funds were questionable (see paragraphs 7.101 to 7.104 below).

**Departure from the ambit of the ISF**

7.71 One completed project of the ISF related to the provision of a grant of \$4.2 million to an industrial design company. As this project was closely related to another project which was still in progress as at March 1997, both projects were examined. The two projects together involved the provision of ISF grants of \$17 million to this industrial design company. Details of the two project are as follows:

- in April 1994, the ID approved a grant of \$4.2 million to cover the company's operating costs for a period of three years and an interest-free loan of \$5 million to run a proposed training programme. The proposed training programme would involve the hiring and training of young industrial design graduates and inviting overseas designers to conduct training courses and seminars and to offer technical advice to students and practising designers in Hong Kong. The requested \$5 million loan was later reduced to \$1.6 million as the company eventually cancelled the hiring and training of designers; and
- in July 1996, the ID again approved the provision of a grant of \$7.5 million to the company to cover its operational costs for a period of three years and another grant of \$5.3 million to run various training programmes (of the \$5.3 million, \$1.6 million was to cover the conversion of the interest-free loan of \$1.6 million, referred to in the first inset above, into a grant).

7.72 Audit noted that this industrial design company had in fact been receiving government funds since its establishment in 1985. In April 1985, the FC approved a government subvention of \$8 million from the GRA Head 176 Subventions: Miscellaneous for the establishment of a limited company to provide Hong Kong industry with product innovation and design services. The objectives of this industrial design company were to provide design services at prices affordable to small and medium-sized manufacturers and to raise the awareness of good design among industrialists.

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7.73 In 1988, the ID reviewed the performance of the industrial design company, two and a half years after the company had been in operation. The review indicated that the company would not be able to meet its objective of achieving financial self-sufficiency in 1990-91, by which time the subvention of \$8 million would likely be exhausted. Because the then Industry Development Board considered that the company should be retained to continue providing design and innovation services to Hong Kong manufacturers, a new company was formed taking over all the assets, liabilities and staff of the old company. Ownership of the new company was transferred to an industry-support organisation. It was then considered that, as a fully owned subsidiary of that organisation, the company could enjoy greater flexibility in running commercially oriented design services.

7.74 In June 1990, the FC approved a further provision of a one-off grant of \$11.4 million under GRA Head 177 Subventions to the holding company of the industrial design company, for the provision of industrial design innovation services to be undertaken by the company. **The FC was informed that no further funds other than the \$11.4 million would be required from the Government in the future and the industrial design company would become self-sufficient in 1994-95. The operating income of the company was then expected to be generated from consultancy fees and from royalties which would be chargeable on products designed by the company.**

7.75 After the establishment of the ISF, this company obtained government funding through the ISF. In April 1994, the ID approved a grant of \$4.2 million to cover the company's operating costs for a three-year period from 1994-95 to 1996-97 (see the first inset of paragraph 7.71 above). The ID was concerned that the company was facing financial difficulty in maintaining its operation beyond 1994-95 and that financial assistance would be required to maintain the company's continued operation. The company again claimed, in its application for ISF grant, that in three years' time it would be self-sufficient. The Government did not re-appraise the business viability of the company.

7.76 In 1996, the company applied again for another grant from the ISF to cover its operational costs for another three-year period, i.e. from 1996-97 to 1998-99 (see the second inset of paragraph 7.71 above). In its application, the company stated that it would suffer a deficit in the three years to 1998-99 but thereafter new business could hopefully be generated and could make the company self-

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sufficient by Year 2000. A chronology of the key events relating to the making of ISF grants to the industrial design company is provided at Annex B.

7.77 On the various occasions when funds were sought from the Government, it was stated in the funding submissions that the company could provide a quality industrial design service to small and medium-sized manufacturers to assist them to move up the "value-added ladder" and help them shift from "original equipment manufacturing" to "original design manufacturing". The ID considered that the company had over the years provided quality consultancy services to the local industries and had developed a modest group of core clients, and was the largest industrial design firm in Hong Kong. The ID concluded that the design services the company offered, and the promotional role it had played, were of great value to the Hong Kong industrial and commercial sectors. However, Audit could not ascertain the basis of the ID's conclusion.

### Audit observations

7.78 As stated in the FC paper setting up the ISF, projects to be financed under the Scheme should be capital or recurrent in nature and if the project requested funds to meet recurrent expenses, the Scheme would only finance the project for a specified duration after which the project should become self-financing (see paragraph 7.67 above). **Audit therefore considers that the provision of grants to the industrial design company under the ISF for a prolonged period is at variance with the ambit of the Scheme.**

7.79 In addition, the company was provided with government funds in 1994 and 1996 despite the fact that the FC was informed in June 1990 that no further funds would be required from the Government (see paragraph 7.74 above). Approval from the FC for continuing to provide funds to the company had not been sought.

7.80 Although the company had failed to achieve financial self-sufficiency after three years as stated in the funding requests in 1990 and 1994, there was no indication that the ID had reviewed and re-appraised the validity of the company's business assumptions and projections. The ID also did not seem to have critically assessed the validity of the company's projection when it informed the ID in 1996 that it would become self-sufficient by Year 2000. The fact that the company had failed to generate income for financial self-sufficiency indicates that the market demand for its design services was not as great as had been portrayed by the company. Audit noted

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that public funds totalling \$31.1 million (Note 17) had been allocated to subsidise the operation of the industrial design company (see paragraphs 7.71 to 7.74 above). It is doubtful whether the continued provision of financial support from the Government to this company is justified.

### Audit recommendation

7.81 Audit has recommended to the Director-General of Industry that he should carry out a critical review of the industrial design company to assess whether it should continue to be financed by the ISF.

### Response from the Administration

7.82 The Director-General of Industry has accepted the audit recommendation. He has said that the ID will initiate a review on the role and financial position of the industrial design company. The Director-General has also said that:

*Provision of grants to the industrial design company under the ISF is at variance with the ambit of the Scheme (see paragraph 7.78 above)*

- (a) the ID was aware of the specific condition in question under which ISF funds might be allocated. It was conscious of the potential problem that continuous funding from the ISF on a regular basis might result effectively in a de facto subvention for the company. All along, the ID's consideration was very much guided by the prospect of the company becoming financially self-sufficient as evidenced in the various applications which had been put to the ITDC and its committees (Note 18);

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**Note 17:** Total grants to finance the operation of the industrial design company amounted to \$31.1 million, which was made up of \$8 million government subvention in 1985, \$11.4 million one-off government grant in 1990 and total grants of \$11.7 million from the ISF made in 1994 and 1996 (excluding ISF grant of \$5.3 million for running various training programmes).

**Note 18:** Audit noted that public funds have been used to finance the operation of the industrial design company for more than ten years, yet the company is still unable to become financially self-sufficient as planned (see paragraphs 7.72 to 7.76 above).

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- (b) the two allocations were sought as grants to enable the company to become self-sufficient. Thus the issue really is what constituted a reasonable "specified" duration. There is no hard and fast rule on this. Each case has to be considered on its merits. Ultimately this is a matter of judgment;
- (c) in the case of the company in question, the ID, the ITDC and its committees had exercised that judgment through assessing and scrutinising the information which had been made available to them;

***Approval of the FC not sought for continuing to provide funds to the industrial design company through the ISF (see paragraph 7.79 above)***

- (d) the FC was indeed informed in 1990 of the assessment that no further government funding would be required. The availability of funds with the establishment of the ISF scheme, for which the FC had approved the conditions under which funds might be allocated from it, raised the issue whether funding from this source would need the FC's explicit approval;
- (e) the ID had consulted the Finance Bureau prior to the 1994 funding application on whether a loan or other forms of funding support for the company was possible, against the background of the 1990 FC submission. The advice given to the ID was that the company was "established for the provision of industrial design innovation service to Hong Kong industry" and that its activities fell "within the ambit of the new block vote which is to fund projects which the ITDC considers to be beneficial to the industrial or technological development of Hong Kong industry. The modes of funding from the block vote, i.e. grants, interest-free loans or interest-bearing loans, may also provide the flexibility required by (the company)" ;
- (f) in these circumstances, the ITDC was duly consulted on the basis of the projected financial self-sufficiency of the company. The established vetting and approval procedures were duly followed and the allocations were made within the financial limits of the delegated authority from the FC. At

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all stages of the consideration, there was never any intention to bypass the FC scrutiny (Note 19);

***Not critically assessing the validity of the company's business plans and their assumptions and projections (see paragraph 7.80 above)***

- (g) it should first be noted that the management of the company in question is overseen by its Board of Directors comprising prominent industrialists, representatives from the ID, the Hong Kong Polytechnic University and the Hong Kong Trade Development Council. The Board has been vigilant in ensuring a proper balance between the financial viability of the company and its public mission. The business plans of the company have been carefully scrutinised by the Board, which has the commercial expertise and experience to pass judgment on the company's financial performance. The ID has also actively monitored the business and progress of the company through its involvement on the Board and has in this process had first hand knowledge about the workings of the company. Thus the ID has been able to critically question and assess the company's business, with input from members of the business community on the Board;
- (h) the decision for approval was made by the ID, the PVC of the ITDC and various parties after careful consideration of the pitfalls and merits of the case, including the quality consultancy services provided by the company, the decrease in losses for 1993-94 as compared with that for 1992-93, the improved financial position of the company and the need for the Government to promote industrial design and develop local product design for high-end market;
- (i) as for the 1996 application, the case was also reviewed first by the Board of Directors of the company. The ID had set out clearly in the relevant ITDC paper the undesirable financial

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**Note 19:** *In approving the one-off grant of \$11.4 million to the industrial design company in June 1990, the FC was informed that no further funds would be required from the Government in the future and that the company would become self-sufficient in 1994-95 (see paragraph 7.74 above). Audit therefore considers that the FC's approval should have been sought if the Government intended to provide further funding to the company.*

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situation of the company. The ID concluded in the ITDC paper that "although it seems unlikely that (the company) could achieve self-sufficiency in the near future, there is the prospect of improvement ahead and the future of (the company) is by no means pessimistic". The application was discussed thoroughly at the ITDC meeting in July 1996 before the latter came to a decision; and

- (j) thus it can be seen that at all stages of the processing of the 1994 and 1996 applications, the issue was not the lack of careful scrutiny of supporting information by the Board of Directors of the company, the ID, the ITDC or its committees. Judgments had to be made and they were made responsibly in the light of the available supporting information and the intensive discussions in different fora at different stages.

**Inadequate monitoring of the Telecommunications Product Technology Centre**

7.83 In June 1994, the FC approved a commitment of \$84 million to be funded by the ISF for the setting up of a Telecommunications Product Technology Centre:

- to undertake applied research and development work on telecommunications and related areas, in collaboration with participants from the local industry; and
- to transfer appropriate enabling and product technologies from local and overseas sources to local industrialists.

7.84 The Centre was established as a wholly-owned subsidiary of the responsible organisation. It has a board of directors which includes representatives of the ID and the responsible organisation.

7.85 It was estimated in the FC paper that the Centre would require \$112 million in the six years from 1994-95 onwards. The commitment of \$84 million approved by the FC (see paragraph 7.83 above) would provide the funds required for the first three years of operation, i.e. from 1994-95 to 1996-97. The responsible organisation expected that the Centre would become self-financing in its sixth year of operation. Before the completion of the first three years of operation, the responsible organisation would conduct a management review of the Centre. On the basis of this management

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review, the Director-General of Industry would decide whether further funds would be provided to finance the Centre and in what form the financial support would take.

### **Shortfall of actual income over projected income**

7.86 As mentioned in paragraph 7.85 above, the Centre aimed to be financially self-sufficient in the sixth year of operation. It was estimated in the FC paper that the Centre would earn \$70.5 million in the first five years of operation, i.e. from 1994-95 to 1998-99 and the Centre would become self-financing in 1999-2000. However, owing to the time taken to recruit a key executive for the Centre, the Centre was only officially launched in April 1996 (currently, the Centre has a total of 37 staff, including 30 engineers). In September 1996, the Centre revised its budgeted income and expenditure, a few months after the commencement of operation. In the revised budget covering the period from 1994-95 to 1998-99, the income was adjusted downwards to \$18.8 million (or 27% of \$70.5 million). This excluded the estimated income of \$5 million from interest earnings for the period. Since the commencement of operation, the Centre only earned \$1.2 million up to July 1997 from consultancy services and the conduct of training and seminars, of which \$0.12 million was income earned before the official launching of the Centre. Compared with the revised estimate of \$1.8 million to be earned for the period from 1994-95 to 1996-97, the Centre's actual income was only 67% of the estimate.

7.87 After reviewing the progress and financial situation of the project, the ID took the initiative in December 1996 to extend the project by two years, during which period the ISF would not provide additional funds. However, the responsible organisation would still be required to submit a final report to the ID on the implementation of the project by the end of the extended period. The conduct of the management review (see paragraph 7.85 above) has been held in abeyance.

### **Income projection and benefits stated in the project proposal**

7.88 Audit noted that although income and expenditure projections were made by the responsible organisation in its proposal submitted in March 1994 to the ID for project evaluation and approval, the assumptions and the basis of projections for the income estimates were not provided. The revenue to be generated from the project, consisting of start-up fees to be paid by participating companies, royalty payments and licence fees collected, was estimated to be \$136 million over a period of six years from 1994-95 to 1999-2000

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(Note 20), as follows:

	Year 1 (94- 95)	Year 2 (95- 96)	Year 3 (96- 97)	Year 4 (97- 98)	Year 5 (98- 99)	Year 6 (99- 00)	Total 1
	(\$ million)						
Start-up fees	3	6	8	10.5	12.4	14	53.9
Licence fees/royalty	-	2	8	16	25	31	82
<b>Total (see Note)</b>	<b>3</b>	<b>8</b>	<b>16</b>	<b>26.5</b>	<b>37.4</b>	<b>45</b>	<b>135. 9</b>

*Note: These figures were submitted by the responsible organisation in its proposal to the ID in March 1994. The figures were subsequently revised in the FC paper.*

There was no information on the estimated number of participating companies, start-up fees to be collected per company, the number of intellectual property rights to be developed by the Centre each year, and royalty payments collectible for the intellectual property developed. The adequacy of the basis of the projections of income was therefore difficult to assess.

7.89 Furthermore, the contribution of the Telecommunications Product Technology Centre to industry was not stated in quantitative terms to facilitate appraisal, monitoring and evaluation of the project. In the project proposal, the benefits of the project were stated as follows:

- "The Centre helps the industry move up-market. It will gradually bring about a recognition from overseas countries that Hong Kong is not just a financial centre or an entrepot but is also a place for innovative and high-tech product development;

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**Note 20:** *Revenue was expected to be generated in the first year after approval of the project. The project was approved by the FC in June 1994.*

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- The Centre assists the industry in product development by working on the underlying and enabling technologies (not end products), the result of which will enable industrialists to develop new products;
  
- Time to market will be reduced as industrialists no longer have to wait for an enabling technology to emerge (e.g. a compression chip set) before reacting and starting on their product development. Concurrent engineering development can take place, with the Centre working on the building block and the industrialists working on the end products simultaneously;
  
- The training scheme implemented in the Centre will provide a critical mass of experienced product designers to the industry; and
  
- With the initial funding from the Government, and support from the industry, the Centre will take on the initiative to develop the enabling technologies. This arrangement greatly reduces the risk to the industrialists, allowing them to shop before they buy, and provides a more level technical playing field for our industry" .

### **Audit observations**

7.90 The Telecommunications Product Technology Centre started operation and began to earn income since 1995-96. However, shortly after the official launching of the Centre, the projected income for the Centre was revised downwards significantly. Based on the revised budget and the actual income earned so far, Audit considers that there is insufficient evidence to show that the Centre will achieve the target of becoming self-financing in the sixth year of operation, i.e. 1999-2000. In December 1996, the ID extended the project by two years without providing any additional financing (see paragraph 7.87 above). Because of the extension, the Centre aimed to be self-financing in the eighth year of operation, i.e. 2001-02. The failure of the Centre to achieve self-financing on target could give rise to further demands for funding and this could result in additional funds being injected into the Centre in order to maintain its operation. According to the FC paper, the responsible organisation planned to conduct a management review of the Centre after the first three years of operation, on the basis of which the ID would decide on the need to provide further ISF grants. In approving the setting up of the Centre in June 1994, the FC was also

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informed that the ID might approach the Committee again for another grant or loan for the fourth to sixth years. As the actual income turned out to be considerably lower than the projected income (see paragraph 7.86 above), it is likely that further capital injection of substantial amounts will be required. **Because of the Centre's unfavourable financial prospects, Audit considers that there is a need for close monitoring of the performance of the project. For future projects involving ISF grants of substantial amounts, especially for the setting up of technology centres, there is a need to critically assess the financial viability of the projects.**

7.91 Furthermore, as quantifiable benefits for monitoring the Centre have not been specified (see paragraph 7.89 above), it is not entirely clear as to what contribution the Telecommunications Product Technology Centre will make to industrial development. **Audit considers that quantitative benefits can be used as benchmarks for monitoring the performance of the Centre.** Such benchmarks may include: number of consultancy assignments to be completed each year; number of enabling technologies that could be applied to the end products to be produced; and anticipated number of industrial establishments which are expected to use the services of the Centre in order to increase their efficiency in production.

### **Audit recommendations**

7.92 **Audit has recommended to the Director-General of Industry that he should:**

- **closely monitor the operation of the Telecommunications Product Technology Centre by carrying out periodic reviews of its business viability and agreeing performance targets with the responsible organisation in order to measure the effectiveness of the operation of the Centre; and**
- **critically assess the financial viability of future projects involving substantial ISF grants.**

### **Response from the Administration**

7.93 The **Director-General of Industry** has said that he agrees with Audit's concerns. He has also said that:

#### ***Monitoring of the Telecommunications Product Technology Centre***

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- the Centre only began full operation in 1996 with the recruitment of the General Manager and other engineering staff. The lower income level at the initial stage of the Centre's operation is expected by the Board of Directors of the Centre as it takes time for the Centre to promote its services and to complete some of its research and development work;
- both the ID and the Board of Directors of the Centre are fully aware of the need to improve the income position of the Centre and are working closely with the General Manager to improve the Centre's business. The benchmarks suggested by Audit will be conveyed to the Board of Directors of the Centre for its consideration; and

***Assessment of financial viability of ISF projects involving substantial grants***

- he agrees that ISF projects of infrastructural type need to be considered with great care, especially those which have substantial recurrent implications. In the recent vetting exercise, the ID has attempted to use an incremental approach in handling some applications of this nature by asking the applicant organisations to start with a one-off programme first. Further funding for the setting up of a permanent facility would only be considered if the original programme proves to be successful.

**Lack of adequate action to follow up project benefits**

7.94 Audit examined the 14 completed major projects (see paragraph 7.70 above) to ascertain the adequacy of follow-up actions taken by the ID in ensuring that the project results had been effectively applied to industry. The examination showed that follow-up actions were not entirely adequate. This is due mainly to the lack of clearly stated benefits in the project proposals. A few examples of the project benefits quoted are shown below:

- (a) broadening the manufacturing capability of the Hong Kong metal industry;

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- (b) promoting the image of Hong Kong exports as environmentally conscious products;
- (c) strengthening the local manufacturers' competitiveness in the world market in terms of better quality;
- (d) helping the industry move up-market;
- (e) enabling Hong Kong industries to remain competitive in markets; and
- (f) improving our environment by minimising the generation of toxic chemical wastes.

7.95 As the objective of the ISF is to strengthen Hong Kong's industrial competitiveness and development, it is therefore of vital importance for the ID to ensure that the knowledge and skills acquired under the ISF projects have been applied to industry. As all ISF projects were handled by industry-support organisations, trade and industrial associations, or tertiary institutions, it was very important to ensure that the project results had been adequately disseminated to the relevant parties and that the new technologies had been effectively applied to industry. An audit of major completed ISF projects revealed that although the responsible organisations always considered in their final reports submitted to the ID that the project objectives had been met, Audit could not ascertain from the ID's records that the new technologies developed had been effectively applied to industry. Two examples are given below:

- ***Development of active environmental noise control technology.***  
The project involved ISF funds of \$2.4 million to enable a local university to develop an active noise control technique to suppress noise below a certain level. It was claimed that, based on the core technology developed, manufacturers could further develop active noise control products for sale in the market. In addition, a number of generic systems could be developed to solve noise pollution problems in Hong Kong industrial areas. The project took two years to complete and was completed in March 1997. The project result was promoted to the public in open-days, through exhibitions and visits of official examiners to the university. However, because the technology was not a consumer product, it was

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difficult to identify potential users. Even before the project was approved, the ID had considered that the project benefit to the manufacturing industry was limited as Hong Kong did not have a strong manufacturing base for noise control products; and

- ***Development of computer-aided engineering (CAE) services for die design and performance improvement of advanced plastics extrusion.*** The project received \$2.6 million financial support from the ISF. It involved the development of advanced extrusion technology through the application of CAE technology for die design and simulation. It was expected that the local plastics manufacturers would be able to upgrade their technology level and expand their product base into high value-added areas. The project was completed in September 1996. It was stated in the project's final report that, while the recipient organisation had promoted the technology to the plastics industry through awareness seminars, training programmes, publication, etc., and that the local plastic extrusion manufacturers were interested in applying CAE technology to plastic extrusion, the high investment on the installation of CAE system and the lack of experienced plastic extrusion engineers discouraged them from using the CAE technology. The recipient organisation also considered that as the local plastic manufacturers might require some time to adopt the new technology, further promotion of the CAE technology was important. According to the project proposal, it was expected that the project could generate income of \$0.25 million from conducting training and consultancy. However, up to March 1996, it could only earn a minimal income (some \$0.05 million) from consultancy, training and seminar fees.

In response to Audit's enquiry, the ID advised that the results of some projects had been effectively applied to industry. For example, the Rapid Prototyping Technology Centre, which was established in June 1995 and involved ISF grants of \$30 million (Note 21), was offering a variety of prototyping services to various manufacturing industries. Similarly, a project for the development of a flavour reference library at another local university, which was undertaken jointly by that university and a local soy sauce

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**Note 21:** *Audit noted that, in March 1997, the Centre had applied to the ID for extending the completion date of the project by one year without additional financing from the ISF. The extension was approved.*

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manufacturer and involved an ISF grant of \$3.6 million (Note 22), had also obtained good response from Hong Kong's soy sauce manufacturers and industrial associations. The soy sauce manufacturer concerned also reported that the project had enabled it to improve its sales.

### Audit observations

7.96 The objective of the ISF is to support local manufacturers to move up-market and to strengthen Hong Kong's industrial competitiveness and development. As such, it is important that the knowledge and skills acquired from ISF projects should be adequately disseminated and effectively applied to industry. Based on an examination of completed major ISF projects, Audit could not obtain evidence that the new technologies developed from the projects had been so applied. Audit also noted that in both the proposals and the final reports submitted by responsible organisations for ISF projects, project benefits were very often only broadly defined. Benefits in quantifiable terms were not defined. This has made it difficult for the ID to monitor and evaluate the effectiveness of the ISF projects in promoting industrial technology development.

7.97 Audit noted that the ID was currently conducting a review of the ISF and a post-project review of those completed ISF projects. Questionnaires were sent out to the project coordinators (Note 23), members of specific committees under the ITDC and to major local trade and industrial associations. Although the project coordinators generally considered in their returns to the survey that the projects had met their objectives, they did not state how the projects had contributed to industry. The majority of the members of specific committees under the ITDC stated in their returns that the projects had partly improved or had very little impact on improving the industry's competitiveness or technological/manufacturing capability.

**7.98 As the objective of the ISF is to finance projects which will be beneficial to the local industry, Audit considers that there is a**

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**Note 22:** *As the project was completed in 1997-98, it was not among the 14 projects examined by Audit as mentioned in paragraph 7.70 above.*

**Note 23:** *A project coordinator is appointed for each ISF project. He is responsible for overseeing the implementation of the project, monitoring its expenditure and ensuring the proper usage of the ISF funds. He is the principal contact person acting on behalf of the recipient organisation to liaise with the ID and the ITDC.*

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need to follow up the projects with manufacturers and industrialists who are the target users of the results. This will provide the ID with an assurance that industry has really been benefited from those projects financed under the ISF.

**Audit recommendations**

7.99 Audit has *recommended* to the Director-General of Industry that he should assess the effectiveness of the ISF in achieving its objective. In assessing the effectiveness of the Fund, measures should be instituted to address the various inadequacies in the operation of the Fund identified in this audit. Audit has also *recommended* that he should:

- introduce measures to ensure that project benefits are:
  - (i) clearly defined and are supported by valid assumptions and realistic projections in the project proposals; and
  - (ii) properly monitored and evaluated to ensure that the project results are effectively applied to industry; and
- conduct follow-up reviews with manufacturers and industrialists to assess the usefulness of project results to industry.

**Response from the Administration**

7.100 The Director-General of Industry has said that:

*Measures to define, monitor and evaluate project benefits*

- he agrees with Audit's recommendations and that the ID will, as far as possible, consider requiring applicants to state the likely project benefits in more clearly defined and quantifiable terms before a project commences;

*Adequacy of follow-up actions on the effective application of project results to industry*

- whether or not the results of an ISF project can be

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effectively applied to industry depends on a number of factors other than their technological merits. The experience of Hong Kong and other economies is that it is unrealistic to expect all results of industrial research and development to be taken up by industry. This is the case even in highly developed industrial economies where major corporations exist and operate with their own in-house or contracted research and development work to meet their very specific and targeted needs. In any case, ultimately this is a business decision for local manufacturers, having regard to their own circumstances or requirements;

- in some cases, the new technologies are not applied immediately because of the high capital investment and the need for the manufacturers to become familiar with the operation details. The case cited in the second inset of paragraph 7.95 is a good illustration. Audit's review, which was conducted only six months after the completion of the project, suggests that the technology has not been applied to the concerned industries. However, the ID's latest information shows that by September 1997, four manufacturers have already adopted the technology to replace or improve their production processes, and several others are considering the same. It is therefore premature and unfair to conclude that the project has failed to achieve its objective;
  
- in addition, it must also be pointed out that there are successful cases and the project results have been adopted or used by the relevant industrial sectors. The cases briefly mentioned in the last part of paragraph 7.95, i.e. the development and introduction of rapid prototyping technologies and the control of the fermentation process for soy sauce production, are two examples; and
  
- the ID is working hard to improve the dissemination of information on the deliverables of the ISF projects. More importantly, the Department is introducing further measures to ensure a closer link between industry on the one hand and industry-support organisations and universities on the other. This will enhance the relevance of applied research and development work conducted under the ISF scheme to the needs of the industry.

### **Questionable actions taken to deal with surplus funds**

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7.101 To support the ISF, a Capital Account block vote was created in April 1994 under the GRA. Each financial year, funds would be allocated by the annual estimate exercise to this block vote to meet the expenditure required for the year for projects previously approved but not yet completed and for projects newly approved. As the expenditure for many industrial support projects would be incurred over a number of years, the block vote account was allowed to be over-committed by 200% to facilitate forward planning and to permit the full use of funds allocated in any one financial year. According to past records, in each financial year, after the project vetting and approval exercise was completed (which would normally be at the beginning of the financial year), funds surplus to meet the approved project requirements were usually identified. A summary of the surplus funds for 1994-95 to 1997-98 is as follows:

Year	Surplus funds identified after the project vetting and approval exercise (\$ million) (a)	Block vote (\$ million) (b)	% of block vote $\frac{(a)}{(b)} \times 100$
1994-95	40	180	22%
1995-96	37	210	18%
1996-97	6	250	2%
1997-98	92	260	35%

*Source: ID's records*

For example, in 1997-98, \$92 million was identified as surplus funds available after the project vetting and approval exercise. As advised by the ID, the surplus funds would be used to finance further applications received after December 1996. As at 5 September 1997, 53 applications were being considered by the ID.

7.102 With the substantial amount of surplus funds available, the ID would take the following actions in order to make full use of the annual provisions:

- invite the industry-support organisations and tertiary

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institutions to submit new project proposals for funding support; and

- request the PVC under the ITDC to reconsider those project proposals not recommended for funding in the first-tier vetting exercise but which have been substantially revised or with new evidence or arguments supporting the applications.

7.103 In addition to the above, ID had also taken a very lenient attitude in releasing project funds to the recipient organisations, particularly near the end of a financial year, as shown in the following three cases:

- in February 1995, the Director-General of Industry was aware that there was still an unspent balance of about \$37 million under the ISF block vote for 1994-95. In order to fully utilise the unspent funds which would otherwise lapse by the end of the financial year, advance instalment payments of some \$34 million were made to six projects, including payments of \$17.2 million to the Telecommunications Product Technology Centre;
- in March 1997, advance payments amounting to \$9.1 million were made to six projects which were undertaken by an industry-support organisation; and
- in July 1996, although the Director-General of Industry was aware that the Telecommunications Product Technology Centre still had an unspent cash balance of \$44.7 million, the ID continued to advance another instalment of \$13.5 million to the Centre and further paid the last instalment of \$14.3 million to the Centre in February 1997. As a result, the Centre was holding a substantial sum of surplus cash amounting to \$50 million which was sufficient to support its operation for two years.

In the cases mentioned in the first and second insets above, the instalment payments would have only been due in the following

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financial years (Note 24).

### Audit observations

7.104 As a result of adopting the various arrangements mentioned in paragraphs 7.102 and 7.103 above, funds in the ISF block vote each year were always fully utilised (see paragraph 7.69 above). **Audit considers that the early release of funds without taking into account the actual requirements of the recipient organisations is not a good financial management practice.** The cases mentioned in the first and second insets of paragraph 7.103 above are examples of this. **By making instalment payments to the recipient organisations without performing thorough cash-flow projections, excessive idle cash which is surplus to operational needs, will also be held by the recipient organisations.** For example, the Telecommunications Product Technology Centre had earned a total of \$4.1 million interest from placing the various instalment payments made by the Government for the Centre on bank deposits for the period from January 1995 to January 1997.

### Audit recommendation

7.105 **Audit has recommended to the Director-General of Industry that he should review the current procedures for the management of the funds in the ISF and strengthen the procedures for releasing instalment payments to projects.**

### Response from the Administration

7.106 The **Director-General of Industry** has said that:

- he agrees that early release of project funds might not be a good management practice and that the procedures for releasing project funds should be reviewed; and

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**Note 24:** *The instalment payments for the various projects should have been due in the succeeding years according to the cash-flow projections shown in the FC submissions but had been released before the recipient organisations submitted their half-yearly progress reports.*

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- the advance payment arrangement was originally intended to ensure optimal use of the ISF funds. In view of Audit's concerns on excessive idle cash held by the recipient organisations, the ID would reconsider if this arrangement should continue in future.

### **COOPERATIVE APPLIED RESEARCH AND DEVELOPMENT SCHEME**

#### **Establishment of the CARDS**

7.107 The then Governor proposed in his 1993 Policy Address the creation of an applied research centre in order to take the fullest advantage of the opportunities which mainland China's modernisation could offer Hong Kong. The applied research centre would draw together the expertise of tertiary institutions in Hong Kong and that of the Chinese Academy of Sciences. In August 1994, an ad hoc steering group was formed under the ITDC to study how to establish the applied research centre.

7.108 Based on the recommendations of the steering group, the Government made a submission in June 1995 to the FC for setting up the CARDS. According to the FC paper:

- the objective of the CARDS was to bring together expertise in Hong Kong and in mainland China to undertake research projects for locally registered companies and to expand technological collaboration between Hong Kong and mainland China;
- the ARC would operate the CARDS; and
- apart from the unique requirement that applicants for the CARDS would need to set up a research team with researchers from both Hong Kong and mainland China, the funding criteria of the CARDS would be similar to those of the ARDS.

The FC approved a sum of \$50 million from the ISF for the setting up of the CARDS.

7.109 The objective of the CARDS was similar to that of the ARDS. It varied from the ARDS in that it aimed at encouraging local companies to undertake joint technology ventures with experts from

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mainland China. Therefore, CARDS has an additional funding criterion in that applicants must assemble a research team with researchers from both Hong Kong and mainland China.

**Audit observations**

7.110 The Scheme has been in operation since June 1995. According to the performance targets, the CARDS was estimated to fund seven projects in the same year. As it turned out, up to March 1997, the Scheme was financing a total of six projects involving a total commitment of \$32 million which was only 64% of the total funds of \$50 million allocated to the Scheme. As advised by the ID, two more projects requesting some \$16 million were being assessed and several other applications would be forthcoming.

7.111 As the Scheme has only been operational for two years and none of the projects has been completed, it is too early to assess the effectiveness of the Scheme. However, Audit noted that some inadequacies found in the ARDS (see paragraph 7.48 above) also apply to the CARDS. For example, there was inadequate assurance that the required share of fundable costs had been contributed from non-government sources to the projects assisted under the Scheme (see paragraphs 7.54 to 7.56 above). Audit observed that in a project for developing transgenic virus-resistant and insect-resistant plants and producing human albumin in pig blood, the recipient company submitted documentary evidence to support a loan "draw down" of \$0.9 million. The requested amount was the ARC's share of fundable costs. However, documentary proof to support the recipient company's share of fundable costs was not available. The ARC released the requested sum in November 1996.

**Audit recommendations**

7.112 Audit has *recommended* to the Director-General of Industry that he should:

- taking into consideration the results of the effectiveness review of the ARDS (see the first inset of paragraph 7.61 above), examine in due course the effectiveness of the CARDS in meeting the objective of the Scheme; and
- taking into consideration the audit recommendation for the ARDS (see the last inset of paragraph 7.61 above), revise the procedures for releasing funds to private companies in order

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to ensure that the required share of fundable costs is contributed from non-government sources.

### Response from the Administration

7.113 The **Director-General of Industry** has said that he agrees that the CARDS can be improved along the lines as the ARDS. However, he has pointed out that Audit's comments on the ARDS relating to the low number of approved projects should not apply to the CARDS.

### OVERALL REVIEW OF THE FUNDING SCHEMES

#### Audit observations

7.114 The Government had launched the four schemes to assist industry, namely the NTTS, the ARDS, the ISF and the CARDS during the period from 1992 to 1995. They were established essentially to cope with the restructuring of the manufacturing industries as the industries had moved from the low value-added work to concentrate on high-value, technology-based products. As mentioned at the beginning of this report (see paragraph 7.1 above), the economy of Hong Kong has undergone a structural transformation in the past two decades. Services have gradually replaced manufacturing as the dominant sector of the economy. With the rapid expansion of the service industries in recent years, the Government launched the SSF in July 1996 (see paragraph 7.5 above) to provide support for projects which would benefit the further development, and increase the competitiveness, of Hong Kong's service industries. In December 1996, ExCo also endorsed that, in order to promote the NTTS, more efforts should be made to promote the Scheme and to make it clear that the Scheme covered not only manufacturing industries but also the service sector (see the first inset of paragraph 7.22 above).

7.115 Although the operations of the four funding schemes are different, their objectives are basically the same in that they are established to promote industrial development. **Based upon the findings of this audit, Audit considers that there is a need to conduct an overall strategic review of these schemes to see if they meet the present-day needs of Hong Kong.** The extent of support as well as the mode of support to the manufacturing industries should be reconsidered in order to assess whether the strategy for operating these funding schemes needs to be redesigned and in doing so the Government should include appropriate goals and performance targets such as:

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- the number of intellectual property rights aimed to be produced a year;
- sales revenue attributable to new processes/products developed;
- the number of industrial establishments aimed to be benefited from the Schemes; and
- the contribution the Schemes would make to Hong Kong's GDP or employment figures.

**Audit recommendations**

7.116 **Audit has recommended that the Administration should:**

- taking into account the Government's industrial support policy, conduct an overall strategic review of the four industrial support funding schemes to see if they meet the long-term needs of Hong Kong; and
- taking into account Audit's recommendations in this review report and the results of the ID's review which is in progress, consider the need for redesigning the mode of operating the various industrial support funding schemes.

**Response from the Administration**

7.117 The **Secretary for Trade and Industry** has said that she agrees with the response of the Director-General of Industry to the various audit observations and recommendations. She also agrees with the audit recommendation that an overall strategic review of the four industrial support funding schemes should be conducted. The TIB will liaise with the relevant bureaux and departments to follow up this matter.

7.118 The **Director-General of Industry** has said that he agrees with Audit's recommendations that the Administration should conduct an overall strategic review of the four industrial support funding schemes and consider the need for redesigning the mode of operating these funding schemes. He will discuss with the relevant bureaux and departments on the longer-term arrangements for the various

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funding schemes.

7.119 The **Secretary for the Treasury** has said that he generally supports Audit's recommendation that a strategic review of the funding schemes in support of industrial and technology development in Hong Kong should be conducted. The Finance Bureau will offer assistance to bureaux and departments concerned as required in the exercise.

refers)

**A summary of the five industrial support funding schemes**

<b>Funding scheme (Date of establishment)</b>	<b>Objective</b>	<b>Funds allocated up to 1996-97 and source of funding</b>	<b>Total amount of grants/loans approved up to 31 March 1997</b>	<b>Policy bureau</b>	<b>Administrative body</b>
NTTS (June 1992)	To provide grants for training on advanced technologies	\$105 million from the GRA	\$7 million	EMB	VTC (with advice of the ITDC)
ARDS (February 1993)	To provide loans or equity participation to support applied research and development work	one-off allocation of \$200 million from the Capital Investment Fund	\$65 million	TIB	ARC (with secretariat support from the ID)
ISF (April 1994)	To provide grants or loans to projects which are beneficial to the industrial or technology development of Hong Kong	\$640 million from the GRA	\$766 million	TIB	ID (with advice of the ITDC)
CARDS (June 1995)	To provide loans or equity participation to support applied research and development work involving mainland China and Hong Kong experts	one-off grant of \$50 million from the ISF	\$32 million	TIB	ARC (with secretariat support from the ID)
SSF (July)	To provide grants or	\$50 million	\$27 million	TIB	ID (with advice

1996) loans to projects which are beneficial to Hong Kong's service industries from the GRA of the SSF Vetting Committee)

refers)

**Chronology of key events relating to the  
making of ISF grants to the industrial design company**

- April 1985      The FC approved a subvention of \$8 million to establish a limited company to provide Hong Kong industry with product innovation and design services.
- October 1985    The design innovation company was incorporated.
- March 1986      The company commenced operation. It aimed to achieve financial self-sufficiency in 1990-91.
- 1988            The ID conducted a review on the performance of the company.
- June 1990       The FC approved a one-off grant of \$11.4 million to an industry-support organisation for it to take over the company. Both the organisation and the company accepted that no more funds other than the \$11.4 million would be provided from the Government in the future. The company aimed to achieve financial self-sufficiency in 1994-95.
- September  
1990            The Government, the industry-support organisation and the industrial design company signed the Memorandum of Agreement on the take-over of the company.
- October 1993    The ID sought advice from the Finance Bureau concerning the financial difficulties faced by the company.
- November 1993   The Finance Bureau advised the ID to consider financial support from the ISF in order to solve the financial difficulties of the company.
- March 1994      The company submitted an application to the ISF. The company aimed to achieve financial self-sufficiency in 1996-97.
- May 1994        The ID approved a grant of \$4.2 million to the company to cover its operational deficit for 1994-95 to 1996-97 and \$5 million interest-free loan for running training programmes.
- March 1996      The company submitted another application to the ISF. It aimed to achieve financial self-sufficiency by the Year 2000.
- July 1996        The ID approved a grant of \$7.5 million to the company covering its operational deficit for 1996-97 to 1998-99 and a grant of \$5.3 million to run

training programmes (of which \$1.6 million is to cover the interest-free loan previously drawn under the application in 1994).

**Acronyms and abbreviations**

ARC	Applied Research Council
ARDS	Applied Research and Development Scheme
ASIC	Application-Specific Integrated Circuit
CAE	Computer-aided engineering
CARDS	Cooperative Applied Research and Development Scheme
EMB	Education and Manpower Bureau
ExCo	Executive Council
FC	Finance Committee
GDP	Gross Domestic Product
GRA	General Revenue Account
HKPC	Hong Kong Productivity Council
ID	Industry Department
ISF	Industrial Support Fund
ITDC	Industry and Technology Development Council
NTTS	New Technology Training Scheme
PVC	Projects Vetting Committee
SSF	Services Support Fund
TIB	Trade and Industry Bureau
VTC	Vocational Training Council